

SUMMARY OF THE INVENTION

The present invention relates generally to an electro-optical display device comprising both a display region and a drive circuit region on a single substrate, in which the drive circuit region is protected against external forces. More particularly, the present invention discloses a first substrate having a display region and a drive circuit region which includes a drive circuit for controlling the display in the display region, wherein these regions are partitioned by a sealing agent. A second substrate is also provided opposed to the first substrate with a liquid crystal material incorporated between the two substrates, wherein the second substrate opposed to the first substrate is extended to oppose both the display region and the drive circuit region provided on the first substrate to thereby provide protection against external forces. Furthermore, the distance between the first and second substrates is larger than the thickness of the drive circuit region, and this distance is substantially uniform through the display region and drive circuit region.

As amended, the present claims contain several features that Applicants do not believe are disclosed or suggested by the prior art of record. Specifically, the independent claims as amended all recite that the distance between the first and second substrates is larger than the thickness of the drive circuit region, and this distance is substantially uniform through the display region and drive circuit region.

PRIOR ART REJECTIONS

The Official Action reject claims 1 and 5 as anticipated by U.S. Patent No. 4,394,067 to Spruijt et al. Spruijt et al. are cited as disclosing a liquid crystal display device including: 1) a first substrate having thereon a display region and a drive circuit region comprising a drive circuit, 2) a second substrate opposed to the first substrate and extended to oppose both of said regions on the first substrate, 3) a sealing agent partitioning the display and drive circuit regions, and 4) liquid crystal material incorporated between the substrates. The Official Action further asserts that Spruijt et al. teach using a simple matrix configuration and a distance between the substrates being larger than the thickness of the drive circuit region.

The Official Action rejects claims 1, 3-6, 8-11, 13-16 and 18-24 as obvious over the Applicants' admission of prior art in view of Spruijt et al. The Official Action asserts that the Applicants' description of a conventional display on pages 1-2 of the specification differs from the claimed invention only in that the second substrate does not extend to oppose the display region and the drive circuit region and further that the drive circuit region does not include a sealing agent surrounding the drive circuit. Spruijt et al. is applied as described above, and further cited as disclosing that sealing the IC between sealing material and the glass plates provides a good mechanical and impervious protection for the IC. Therefore, the Official Action asserts it would have been obvious to extend the second substrate, in the conventional display device described by the Applicants, to oppose the drive circuit region and to include a sealing agent surrounding the drive circuit to provide good mechanical and impervious protection of the drive circuit.

In response to the above rejections, Applicants have amended all independent claims herewith and respectfully assert that none of the cited references relied upon in the Official Action disclose or suggest the features of the present claims as amended. As noted above, the amended claims recite that the distance between the first and second substrates is larger than the thickness of the drive circuit region, wherein this distance is substantially uniform through the display region and drive circuit region. Applicant respectfully asserts that this feature is not disclosed or suggested by the prior art of record and the combination of these features is sufficient to render these claims non-obvious in view of the prior art of record. While Spruijt et al. may disclose a distance between the substrates is larger than the thickness of the drive circuit region, this distance is not substantially uniform throughout the display region and the drive circuit region. Spruijt et al. disclose that the distance between the first and second substrates throughout the display region and part of the drive circuit region is smaller than the thickness of the drive circuit region (IC-crystal 9), as described at Col. 1, lines 58-61. Spruijt et al. recite that the distance between the two substrates is approximately 4-30 μm , whereas the thickness of the IC-crystal is approximately 250 μm . Accordingly, Spruijt et al. requires that a cavity be recessed in the second substrate in order to accommodate the IC-crystal, wherein the cavity is formed by ultrasonic drilling (Col. 1, lines 61-64). Therefore, Spruijt et al. not only fails to disclose the distance between the two substrates being substantially uniform through the display and drive circuit regions, Spruijt et al. further teach away from a substantially uniform distance by requiring a cavity to be formed in the drive circuit region in order to accommodate the IC-crystal. The fabricating process of the display device in Spruijt et al. is quite complicated, whereas in the

present invention there are no complicated processes required, such as ultrasonic drilling, in forming the display device since the distance between the first and second substrates is substantially uniform and larger than the thickness of the drive circuit region. In view thereof, withdrawal of the outstanding rejections is in order and reconsideration is respectfully requested.

With respect to claims 11, 13-16 and 18-20, nothing in the prior art discloses a resin material covering a drive circuit region while also contacting a second substrate opposing the drive circuit region. The applicants have found that by having the resin material contacting the second substrate, the drive circuit can be effectively protected from transformation of the substrate during fabrication. It is respectfully submitted that this combination of references fails to make out a prima facie case of obviousness, because the combination does not produce the invention recited in the claims of having the resin material covering the drive circuit region while also contacting the second substrate.

Additionally, the Official Action stated that claims 2, 7, 12 and 17 would be allowable if rewritten in independent form to include all of the limitations of their base claims and any intervening claims. In view of the amendments herein, their respective independent claims 1, 6, 11 and 16 are believed to be in condition for allowance. Therefore, claims 2, 7, 12 and 17 are also now believed to be in condition for allowance.

FORMALITIES

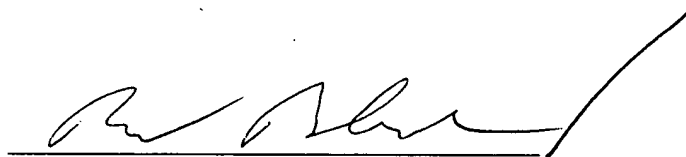
The Official Action rejects claims 5 and 10 under 35 U.S.C. § 112, second paragraph, as being indefinite, and the Examiner suggests that the term

"a simple matrix electrodes" should be changed to --a matrix of electrodes--. By the above amendments, the Applicants have adopted the Examiner's suggestion into the amended claims, and the Applicants now believe that the claims particularly point out and distinctly claim the subject matter which the Applicants regard as the invention, and reconsideration is requested.

CONCLUSION

In each case, the pending rejections should be reconsidered in view of the amendments and remarks herein. Applicants believe that this case is in good condition for allowance, and a Notice of Allowance is earnestly solicited. If a telephone or further personal conference would be helpful, the Examiner is invited to call the undersigned, who will cooperate in any appropriate manner to advance prosecution.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Bradley D. Blanche", is written over a horizontal line.

Bradley D. Blanche
Reg. No. 38,387

Sixbey, Friedman, Leedom & Ferguson, P.C.
2010 Corporate Ridge, Suite 600
McLean, Virginia 22102
(703) 790-9110
(703) 883-0370 - FAX